

REMARKS

As an initial matter, Applicant appreciates the thorough examination by the Examiner. Applicant acknowledges that it has overcome the previous rejection of claims 1-6 under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,286,064 to Bridges. Applicant further acknowledges that it has overcome the previous objections to the drawings and abstract.

The Examiner's Objections

The Examiner objects to the drawings and alleges that the "sealing unit provided inside each of the body part and the reinforcing unit" as recited in lines 3-4 of claim 4 is not shown. In response to the Examiner's objection, Applicant addresses the Examiner's concerns below.

The Examiner's Rejections

The Examiner rejects claims 1-7 under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention. In response to the Examiner's rejections, Applicant submits amended claims and addresses the Examiner's concerns herein below.

The Examiner further rejects claims 1-7 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,286,064 to Bridges (hereinafter "Bridges") either alone or in combination with U.S. Patent No. 4,889,167 to Morris (hereinafter "Morris") or U.S. Patent No. 6,519,815 to Cassel et al. (hereinafter "Cassel"). In response to the Examiner's rejections, Applicant submits amended claims and addresses the Examiner's concerns herein below.

Figures 3, 4, and 5 Depict a Sealing Unit

In the Office Action at page 2, the Examiner objects to the drawings and alleges that “a sealing unit provided inside each of the body part and the reinforcing unit” as recited in lines 3-4 of claim 4 is not shown. The Examiner states that the sealing unit must be “within” the body part and reinforcing unit (i.e., “encased structurally within the outer surface of the structures”).

Applicant notes that the term “inside” used as a preposition is defined in commercially available dictionaries as follows:

- on the inner side of (e.g., just inside the door); or
- in or into or as if in or into the interior of (e.g., waited inside the church).

Merriam-Webster Online Dictionary, <http://www.m-w.com> (2008).

As depicted in Figures 3, 4, and 5, the inside or inner side of the body part is the surface closest to the interior of the body part. The inside or inner side of the reinforcing unit is the surface opposite the face of the reinforcing unit that is positioned against the inner surface of the body part.

Applicant directs the Examiner to Figures 3, 4, and 5, wherein sealing units 11, 11a, 41, 41a (see line 2, Paragraph [0027]) are depicted. Specifically, Figure 3 depicts sealing unit 11 on the inner side of body part 10. Figure 3 further depicts sealing unit 41 on the inner side of the reinforcing unit 40. Further, Figure 4 depicts sealing unit 11 on the inner side of body part 10. Still further, Figure 5 depicts sealing unit 11a on the inner side of body part 10a and sealing unit 41a on the inner side of reinforcing unit 40a.

Applicant submits that the term “inside” is not necessarily limited to the definition provided by the Examiner (i.e., encased structurally within the outer surfaces of the structures). Accordingly, Applicant submits that the drawings depict every feature of the invention specified in the claims.

Applicant notes the original application was filed in Korean, hence the language in the English translation may not appear as standard vernacular to native English speakers. That said, in an effort to advance prosecution, Applicant has amended claim 4 to clearly state that the sealing unit is provided “against the interior surface of” each of the body part and the reinforcing unit.

Amended Independent Claim 1 is Now Definite

The Examiner rejects claims 1-7 under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention. Applicant disagrees with the Examiner’s assessment of the structure of Bridges for the reasons set forth below.

With respect to claim 1, lines 4-7 recite “the body part defining a longitudinal axis extending between the pair of opposing circumferential edges, the body part further defining a transverse axis extending between the pair of opposing axial edges of the body part (emphasis added).” The Examiner states that it is unclear as to which “longitudinal axis” extends between the pair of opposing circumferential edges. As understood by the Examiner, the phrase “longitudinal axis” refers to the central longitudinal axis of the cylindrical structural shape of the body part. Claim 1 has been amended to reflect as much. Examiner also states that the phrase “transverse axis” is unclear. As understood by the Examiner, the phrase “transverse axis” refers to any axis that is transverse to the central longitudinal axis of the cylindrical body part.

With respect to claim 1, lines 17-18 recite “the reinforcing unit further defining a transverse axis extending between the pair of opposing axial edges of the body part (emphasis added). The Examiner queries whether Applicant intended the phrase “body part” to read “reinforcing unit.” Applicant has amended claim 1 to delete the phrase “body part” and substitute the phrase “reinforcing unit” therefore. The Examiner also

questions whether the phrase “transverse axis” refers to (1) a longitudinal axis extending between a pair of opposing actual edges of the reinforcing unit or (2) any axis that is transverse to the central axis of the arc of the curved plate located between the opposing axial edges of the reinforcing unit. As understood by the Examiner, the phrase “transverse axis” refers to any axis that is transverse to the central axis of the curved plate shaped reinforcing unit that is located between the opposing axial edges of the reinforcing unit. Amended claim 1 reflects as much.

In regard to claim 1, lines 19-22 recite “wherein at least one edge of the pair of opposing circumferential edges of the body part and at least one edge of the pair of opposing circumferential edges of the reinforcing unit are substantially coplanar with respect to the transverse axes of the body part and reinforcing unit (emphasis added). Applicant has amended claim 1 to specify that at least one edge of the pair of opposing circumferential edges of the body part and at least one edge of the pair of opposing circumferential edges of the reinforcing unit are substantially coplanar with respect to one another (emphasis added).

In regard to claim 7, lines 4-6 recite “the positioning means facilitating the horizontal positioning of the reinforcing unit with respect to the body part.” The Examiner states that the term “horizontal” is relative and requests further clarification. Applicant submits that the phrase “with respect to the body part” modifies the term “horizontal” and is sufficiently clear for the purpose of 35 U.S.C. §112. Nevertheless, in an effort to satisfy the Examiner, Applicant has amended claim 7 to clarify that the positioning means promotes the horizontal positioning of the reinforcing unit with respect to the central longitudinal axis of the body part (emphasis added).

In view of the explanation above and amendments to claim 1, Applicant submits that claim 1 is now definite.

The Amended Claims are Not Obvious in View of Bridges, Morris, and Cassel

The Examiner rejects claims 1-7 under 35 U.S.C. §103(a) as being unpatentable over Bridges either alone, or in combination with Morris or Cassel. Applicant submits that the claims are not rendered unpatentable in view of the cited art for the reasons set forth below.

Bridges

U.S. Patent No. 5,286,064 to Bridges discloses a sealing plate for use with a pipe coupling to prevent leakage of pipelines. Referring to Figures 1 and 2, the sealing plate (or reinforcing unit) 10 includes a pair of opposing axial edges 14, a pair of opposing circumferential edges 15, a pair of axial sealing pads 20 positioned on the outer or exterior surface 16 of the axial edges 14, and a pair of circumferential sealing pads 40 positioned on the inner or interior surface 17 of the circumferential edges 15 of the plate. As depicted in Figure 3, the sealing plate 10 is used in conjunction with a circular pipe coupling 50 to prevent leakage in a pipeline.

Referring to the orientation of the sealing plate 10 and pipe coupling 50 illustrated in Figure 3, Bridges' coupling 50 includes opposing circumferential edges (i.e., left and right ends or edges of the coupling), opposing axial edges (i.e., upper and lower edges of the coupling depicted in solid and dashed lines above and below the numeral "52"), and an axial slit 52 defined by the opposing axial edges of the coupling. The coupling 50 of Bridges defines a longitudinal axis that extends between the pair of opposing circumferential edges (i.e., extending left to right as oriented in Figure 3), and a transverse axis extending between the upper and lower portions of the coupling (as oriented in Figure 3).

With reference to Figures 1 and 3, the axial sealing pads 20 of the plate 10 are secured to and extend along the exterior surface 16 of the axial edges 14 of the plate.

Upon joinder of the sealing plate 10 and the coupling 50, the axial sealing pads 20 extend along the longitudinal axis of the coupling 50 as depicted in Figure 3.

The coupling 50 defines annular recesses 55 for receiving gaskets 60, wherein the recesses are spaced apart along the surface of the coupling. As shown in Figures 3 and 6, the recesses 55 are spaced apart from the circumferential edges of the coupling 50. Contrary to the Examiner's opinion, the longitudinal axis of the coupling 50 defines upper and lower parts, wherein each part has diameters that differ, but each part has at least one diameter that is identical to the other part (see Figure 3). Thus, each respective part of Bridges' coupling has varying diameters (i.e., not constant).

Referring to Figure 3, the upper (or left) part of the coupling 50 has one diameter defined by the leftmost annular recess 55. The upper part of the coupling has another diameter defined by the remaining portions of the coupling to the immediate left (or edge) and right of the leftmost recess 55. Similarly, the lower (or right) part of the coupling 50 has one diameter defined by the rightmost annular recess 55, and another diameter defined by the remaining portions of the coupling to the immediate right (or edge) and left of the rightmost recess 55. Stated differently, the diameters of the two parts of the coupling 50 defined by the annular recesses 55 differ from the diameters of the three remaining transverse parts of the coupling.

Accordingly, each of the upper and lower parts of Bridges' coupling 50 has varying diameters. Moreover the coupling 50 is not graduated (e.g., increasing in diameter) with respect to the upper and lower parts, thus the diameter of one part is the same as the diameter of the other part.

As an initial matter, Applicant directs the Examiner's attention to annotated Attachment A depicting Figure 1 of Bridges (see office action). The Examiner has mislabeled (i.e., transposed) the longitudinal and transverse axes of the sealing plate. The

“transverse axis” is in fact in the “longitudinal axis” by definition. The term “longitudinal” is defined in commercially available dictionaries as follows:

- placed or running lengthwise; or of or relating to length or the lengthwise dimension.”

Merriam-Webster Online Dictionary, <http://www.m-w.com> (2008).

It is understood that the term “length” refers to the longer or longest dimension of an object. As shown in annotated Figure 1 of Attachment A, the longest dimension of the sealing plate extends from the leftmost axial edge 14 to the rightmost axial edge 14.

Likewise, the “longitudinal axis” is in fact the “transverse axis.”

Thus, Bridges fails to disclose a reinforcing unit defining a longitudinal axis extending between a pair of opposing circumferential edges. Rather Bridges discloses a reinforcing unit defining a longitudinal axis extending between a pair of opposing axial edges. Similarly, Bridges fails to disclose a reinforcing unit defining a transverse axis extending between a pair of opposing axial edges. Rather Bridges discloses a reinforcing unit defining a transverse axis extending between a pair of opposing circumferential edges.

The Reinforcing Unit (or Sealing Plate) of Bridges is Not Gradually Reduced in Thickness from its Center to Both Axial Edges

The sealing plate (or reinforcing unit) 10 of Bridges includes a central plate member 12 that defines a pair of opposing axial edges 14 and a pair of opposing circumferential edges 15. As depicted in Figures 1 and 2, the central plate member 12 is uniform in thickness (i.e., constant thickness). The axial sealing pads 20 are secured along the outer surface 16 of the axial edges 14. Each of the sealing pads 20 is triangular in cross-section. The axial sealing pads 20 extend beyond the axial edge 14 of the plate 12 to form a skirt 24. The circumferential sealing pads 40 of the plate 12 are secured to

the inner surface 17 of the plate member 12. Although a portion of the sealing plate is reduced in thickness at both ends—from the elongate face 21 of the axial sealing pads 20 to the skirt 24—the sealing plate 10 is not gradually reduced in thickness along its entire transverse axis from its center to both axial edges as set forth in amended claim 1.

Bridges' sealing plate 10 has a thickness that varies along the length of the transverse axis. The variable thickness results from the fact that the axial sealing pads 20 at one edge have a triangular cross-section, and the circumferential sealing pads 40 at another edge have a semicircular cross-section. As clearly illustrated in Figure 4, Bridges' sealing plate 10 has a thickness that first increases along the transverse axis from the center of the plate member 12 to the apex ridge 22, and then decreases from the apex ridge 22 to the skirt 24 (or axial edge 14). Stated differently, the sealing plate 10 varies in thickness along the entire length of its transverse axis.

Accordingly, the person of ordinary skill in the art would not reasonably draw the inference from Bridges of a sealing plate 10 that is gradually reduced in thickness along its entire transverse axis from its center to both axial edges as set forth in amended claim 1. Indeed, when properly read for all that it teaches, Bridges teaches away from the claimed invention, and the skilled artisan would reach the opposite conclusion, that is, that Bridges requires the use of (1) circumferential sealing pads 40 extending parallel of the gap between pipe ends and (2) axial sealing pads 20 extending perpendicular to the gap such that the sealing plate 10 can be used with separate circular O-rings and arcuate gasket segments 60 built into the inner surface of the coupling 50 (see column 4, lines 51-61). Bridges requirement to use O-rings and gasket segments teaches the use of a sealing plate 10 that varies in thickness along its entire length of the transverse axis.

Further, neither Morris nor Cassel discloses a sealing plate of the type claimed by Applicant. Thus, Bridges, alone or in combination with Morris and Cassel, fails to describe, teach, or suggest a reinforcing unit being gradually reduced in thickness along

its entire transverse axis from its center to both axial edges. Accordingly, Bridges must be removed as a reference.

The Supreme Court recently addressed the standard for determining obviousness in *KSR Int'l Co. v. Teleflex, Inc.*, 127 S.Ct. 1727 (2007). The Court stated that the *Graham v. John Deere Co. of Kansas City*, 383 U.S. 1, 86 S.Ct. 648 (1966) factors still control an obviousness inquiry. Those factors are: the scope and content of the prior art; the differences between the prior art and the claims at issue; and the level of ordinary skill in the pertinent art. *Id.*, 127 S.Ct. at 1734 (quoting *Graham*, 383 U.S. at 17-18).

The KSR Court recognized that prior art teaching away from combining certain elements is an indicator of the nonobviousness of a claimed invention. *KSR*, 127 S. Ct. at 1740 (citing *United States v. Adams*, 383 U.S. 39, 86 S.Ct. 708 (1966)). See also *In re Sullivan*, 2007 U.S. App. LEXIS 20600 (Fed. Cir. 2007) (Evidence rebutting a prima face case of obviousness of a claimed invention can include evidence that prior art teaches away from the claimed invention in any material respect).

The claimed invention differs significantly from the Bridges device, and the Examiner admits that Bridges does not teach numerous elements of the claimed invention. Further, Bridges does not teach or suggest modifying the device in the manner suggested by the Examiner. Indeed, modifying the Bridges device in the manner proposed by the Examiner would actually frustrate the intended purpose of the Bridges device. Thus, Bridges actually teaches away from the claimed invention. The Supreme Court confirmed in its *KSR* decision that, as in the current application, prior art teaching away from combining certain elements is an indicator of the nonobviousness of a claimed invention.

Bridges Fails to Disclose a Graduated Body Part Wherein the Constant Diameter of One Part is Greater than the Constant Diameter of the Other Part

As illustrated in Figures 5 and 8, and set forth in amended claim 3, the subject invention includes a body part 10, 10a wherein the upper and lower parts have constant diameters. The body part 10, 10a also includes a stepped part 12a separating the upper and lower parts. The stepped part results in upper and lower parts that are separated by a graduated stepped part such that the diameter of the one part is greater than the diameter of the other part.

In regard to claim 3, the Examiner argues that Bridges discloses a stepped body part as claimed by Applicant. Bridges describes a coupling 50 defining annular recesses 55 in both the upper and lower parts of the body part or coupling 50. Amended claim 3 recites a stepped body part having (1) an upper part defined by an area between one of the circumferential edges of the body part and the stepped portion, and (2) a lower part defined by an area between the other circumferential edge of the body part and the stepped portion. As amended, claim 3 now recites upper and lower body parts having a common border along the circumferential edge of the stepped portion, wherein the upper and lower parts are positioned relative to the longitudinal axis of the body part.

The Examiner has misconstrued Applicant's reference to "upper" and "lower" as depicted in Figure 3 of Attachment D (see office action). Specifically, the Examiner has construed the terms "upper" and "lower" relative to the transverse axis of the body part. More accurately, Applicant's reference to "upper" and "lower" are relative to the longitudinal axis of the body part. Applicant has amended claim 3 to distinguish from Bridges and clarify the portions of the body part that define the upper and lower parts. In particular, Applicant's upper part is defined by an area extending between a first circumferential edge of the body part and the stepped portion, and the lower part is defined by an area extending between a second circumferential edge of the body part and the stepped portion.

Bridges discloses a coupling having upper and lower parts, wherein each part has diameters that differ or vary, but each part has at least one diameter that is identical to the other part. Thus, the upper and lower parts of the Bridges' coupling 50 are not graduated with respect to one another. In other words, the diameters of the upper and lower parts of Bridges' body part 50 are neither constant nor graduated as claimed by Applicant.

Thus, Bridges alone, or in combination with Morris and Cassel, fails to describe, teach, or suggest a body part having a stepped portion that separates upper and lower parts (relative to the central axis of the body part), wherein each of the parts has a constant diameter that is different from the other. In other words, the cited art fails to describe, teach, or suggest a body part having an upper (or lower) part with a constant diameter that is greater than the constant diameter of the lower (or upper) part as claimed by Applicant.

The Positioning Means of Bridges Does Not Correspondingly Engage and Extend into the Longitudinal Slot of the Body Part

With respect to claim 7, the Examiner alleges that Bridges discloses a positioning means that facilitates the horizontal positioning of the reinforcing unit when the positioning means aligns with at least a portion of longitudinal slot of the body part. Applicant believes the Examiner has misconstrued the meaning of the term "align" as used in claim 7. Bridges fails to disclose a positioning means that aligns with longitudinal slot or axial slot of the body part. The axial ridges 36 (or positioning means) secured to the axial sealing pads 20 of the Bridges' sealing plate 10 do not align (i.e., come into a straight-line) with the longitudinal slot or axial slit between the axial edges of the body part 50 as depicted in Figure 3. Rather, the axial ridges 36 are positioned perpendicular to the axial slit when the body part 50 is placed over the sealing plate (see Figure 3). Applicant's positioning means 43, 43a align with the axial slit defined by the axial edges of the body part 10, 10a.

Further, the Examiner alleges that Bridges discloses a positioning means extending longitudinally along a least a portion of an outer surface of the reinforcing unit. To the contrary, the axial ridges 36 (or positioning means) Bridges extend transversely with respect to the longitudinal axis of the sealing plate. Stated differently, Applicant's positioning means 43 extends in a longitudinal direction (i.e., lengthwise) along the reinforcing unit 40, whereas Bridges' axial ridges 36 extend in a transverse direction (i.e., widthwise). As noted above, the Examiner has incorrectly defined the longitudinal and transverse axis in Attachment A depicting Figure 1.

Moreover, amended claim 7 now recites that the positioning means correspondingly engages and extends into at least a portion of the longitudinal slot of the body part (emphasis added). Bridges fails to disclose a positioning means that engages and extends into the axial slit of the body part 50. Bridges—alone or in combination with—Morris and Cassel fails to describe, teach, or suggest a positioning means that correspondingly engages and extends into at least a portion of the longitudinal slot of the body part 50.

Combination of Bridges, Morris, and Cassel Fails to Disclose Applicant's Stop Means

Cassel discloses a band clamp 10g having a clamp band 16g, a tightening mechanism 18g, and a tongue member 13 disposed inside the clamp band, wherein the tongue member bridges across the tightening mechanism. The tongue member forms an extension of the clamp band to provide a continuous surface for engaging a hose in the joint to be clamped. The Examiner alleges that the tongue member of Cassel is equivalent to the stop means 42, 42a of the present invention. Cassel's tongue member is not a stop means for the reasons set forth below.

With respect to claim 2, the Examiner argues that it would have been obvious to one having ordinary skill in the art to modify the reinforcing unit as provided by Bridges

in view of Morris with the stop means as taught by Cassel to bridge across the tightening mechanism. Cassel teaches the use of a tongue member 13 to form an uninterrupted surface across spaced apart sidewalls 26g, 28g of the tightening mechanism. Edges of the tongue member extend above and below the circumferential edges of the clamp (see Figures 19 and 20). The tongue member fails to function as a means for stopping or positioning the clamp about a hose or joint. Rather, the tongue member provides a continuous surface adjacent to the joined hoses or pipes in order to prevent leakage at a joint. Accordingly, the tongue member is a sealing means—not a stop means.

There is no motivation to combine Bridges and Cassel because Bridges' gaskets 60 and guide channels 34—formed by the inner and outer humps 33, 30 of the axial sealing pads 20—function as a stop means. Stated differently, it is Bridges' gaskets 60 that serve as a stop means in that they position or stop the reinforcing unit when the gaskets 60 engage the guide channels 34. Thus, there is no motivation to incorporate the tongue member of Cassel into the reinforcing unit of Bridges because Bridges includes a stop means.

Moreover, the combination of Bridges sealing plate 10 (or reinforcing unit) and Cassel's tongue member (or stop means) would result in a reinforcing unit having a tongue member with edges that extend above and below the circumferential edges of the reinforcing unit, wherein the edges extending toward the pipe to be joined would create a gap between the reinforcing unit and pipe through which liquid would flow, thereby defeating the purpose of the coupling. In other words, Cassel's tongue, when combined with Bridges' reinforcing unit, would space the reinforcing unit apart from the pipe surface and promote leakage.

Accordingly, Cassel fails to teach or suggest the use of the tongue to stop or position the reinforcing unit and body part against a pipe joint. Thus, the combination of

Bridges, Morris, and Cassel fails to describe, teach, or suggest a stop means as claimed by Applicant. In this instance, Cassel must be removed as a §103(a) reference.

Combination of Bridges, Morris, and Cassel Fails to Disclose Applicant's Close Contact Means

Morris discloses an elastomeric sheet 18 molded with a plurality of shallow depressions 22 arranged in a waffle pattern as shown in Figure 1. With respect to claim 5, the Examiner alleges that the sheet 18 of Morris, and more specifically the depressions 22 formed therein, is equivalent to Applicant's close contact means. Applicant disagrees for the reasons set forth below.

Applicant's close contact means are strips that are spaced apart and extend continuously along the longitudinal axis of the sealing unit 11, 11a (see Figure 6). Morris teaches a sheet wrapped against the interior of body part. Accordingly, Morris fails to disclose the use of continuous strips as a close contact means. Thus, the combination of Bridges, Morris, and Cassel fails to describe, teach, or suggest a stop means as claimed by Applicant. In this instance, Morris must be removed as a §103(a) reference.

The Amended Claims Include Patentable Subject Matter

Amended independent claim 1 now recites a pipe joint having a body part and a reinforcing unit, wherein the reinforcing unit is gradually reduced in thickness along its entire transverse axis from its center to both axial edges. Bridges discloses a reinforcing unit having uniform thickness.

Claim 2 recites a stop means having one edge that extends laterally away and above the surface of the reinforcing unit surface. Cassel teaches a tongue member with edges that extend above and below the circumferential edges of the reinforcing unit. Cassel is an improper reference because the combination with Bridges and Morris would separate the reinforcing unit from the pipe and promote leakage.

Amended claim 3 recites upper and lower parts of a graduated body part, wherein each part has a constant diameter and the constant diameter of one part is greater than the constant diameter of the other part. The diameters of the upper and lower parts of Bridges' body part are neither constant nor graduated,

Amended claim 7 recites a positioning means that correspondingly engages and extends into the longitudinal slot or axial slit of the body part. Bridges fails to disclose a positioning means that engages and extends into the axial slit of the body part.

Thus, Applicant submits that the amended claims are not obvious over Bridges either alone, or in combination with Morris or Cassel, and are now allowable.

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CONCLUSION

Based on the foregoing amendments and arguments, Applicant submits that pending Claims 1-7 are now in immediate condition for allowance, and the same is respectfully requested.

Respectfully submitted,

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